North Carolina Department of Environment and Natural Resources

Dexter Matthews, Director | **Division of Waste Management** | Beverly Eaves Perdue, Governor
Dee Freeman, Secretary

May 11, 2010

Sent Via US Mail and Email - sgarrison@madisoncountync.org

Mr. Steve Garrison
Madison County Manager
P.O. Box 579
Marshall, NC 28753

Re: *PCE Investigation Summary Report*
Mr. Joel Edwards Property
Closed and Unlined Madison County Landfill, Permit #58-02

Dear Mr. Garrison:

The Solid Waste Section has reviewed the *PCE Investigation Summary Report* dated April 14, 2010 submitted via email on April 21, 2010 by Altamont Environmental, Inc. The *PCE Investigation Summary Report* was submitted pursuant to the December 22, 2009 scope of work that was approved on January 7, 2010. The basis of the scope of work was to determine the source of the Appendix I volatile organic compound, Tetrachloroethene (PCE), in a residential water supply well identified as DW-02-Edwards near and potentially downgradient of the closed, unlined Madison County Landfill, Permit #58-02. Per the report, the investigation was completed in an effort to evaluate whether the Edwards' property contained a potential source of PCE that has impacted the Edwards' domestic water supply well and to evaluate whether PCE exists in the shallow groundwater observed to be leaking past the surface casing of the well.

The scope of work included the following which was conducted on February 12, 2010: collecting and analyzing five shallow soil samples (SB-1 through SB-5) using a direct-push rig until refusal was met (11–18 feet); collecting and analyzing one composite sample of the wood mulch (Mulch-1) from the area immediately surrounding the well; collecting and analyzing one sample of the shallow groundwater approximately 10 feet below the surface casing using a packer and pump system; and collecting strike and dip measurements from rock outcropping exposed by the excavation for the Edwards' house.

The following are the results of the scope of work:

1. The analytical soil results indicated that no volatile organic compounds exceeded the NCDENR's Inactive Hazardous Sites Branch Health Based Soil Remediation Goals Updated October 2009 (Protection of Groundwater). However, the volatile organic compounds 2-Butanone (MEK), p-Isopropyltoluene, naphthalene, and toluene were detected as estimated concentrations (J flagged values) within the soil samples collected between 11-18 feet on the property. The volatile organic compound acetone was also detected as estimated

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concentrations (J flagged value) within the soil samples, except for SB-5 that had a quantifiable concentration of 110 ug/kg, but still below the soil standard of 2,800 ug/kg. Acetone was not discussed within the text or provided within the tables of the report, however, the laboratory conducting the analyses, Pace Analytical Services, Inc, stated in the March 5, 2010 and March 19, 2010 emails that the acetone hits above the J flagged values were considered a laboratory contaminant.

2. The analytical composite mulch results indicated one volatile organic compound that exceeded the NCDENR's Inactive Hazardous Sites Branch Health Based Soil Remediation Goals Updated October 2009 (Protection of Groundwater). Methylene chloride was detected at 20.7 ug/kg and the soil standard is 20 ug/kg. The volatile organic compounds acetone and chloroform were detected as estimated concentrations (J flagged values) within the composite mulch sample collected around the well. Acetone was not discussed within the text or provided within the tables of the report, however, the laboratory conducting the analyses, Pace Analytical Services, Inc., stated in the March 5, 2010 email, the March 19, 2010 email, and the March 9, 2010 letter that the acetone hits above the J flagged values and the low level hits for trihalomethane disinfectant by products (i.e. chloroform) were considered laboratory contaminants.
3. The analytical shallow groundwater sampling results indicated one volatile organic compound exceedance, PCE, which is consistent with the historical analytical deep groundwater sampling results collected by Altamont Environmental, Inc. and the Madison County Health Department from April 2009 to the present. In addition, two volatile organic compounds, chloroform and chloromethane were detected as estimated concentrations (J flagged values) within the shallow groundwater sample. These two constituents have not been historically detected in the deep groundwater samples collected from the Edwards' well. However, the laboratory conducting the analyses, Pace Analytical Services, Inc., stated in a March 9, 2010 letter that the low level hits for trihalomethane disinfectant by products (i.e. chloroform) were considered laboratory contaminants.
4. Based upon the strike and dip measurements, two dominant fracture orientations were identified. One fracture set appears to strike generally north/south and dips vertically and the second fracture set appears to strike northeast/southwest and dips 60-75 degrees for the northwest.

Per the *PCE Investigation Summary Report*, the following are conclusions based upon this scope of work:

1. The soil sampling results suggest that volatile organic compounds are present within the soils on the Edwards' property.
2. The PCE exceedance within the shallow groundwater sample and the over-pumping event conducted in August 2009 suggests that PCE has impacted the shallow groundwater aquifer or surface water within the vicinity of the well, could potentially be leaking past the surface casing, and is not impacting the primary water bearing fracture located between 360-362 feet below ground surface within the well.
3. Chloromethane has been shown to be breakdown product of methylene chloride under anaerobic conditions. Since methylene chloride exceeded the soil standard within the mulch sample and chloromethane was detected within the shallow groundwater sample, it is not unreasonable to consider that the methylene chloride within the mulch could break down into its daughter compound while being conveyed via stormwater/groundwater into the well. Chloroform is also a parent compound of both methylene chloride and chloromethane which were both detected within the shallow groundwater sample collected from the well.
4. The orientation of the two dominant fracture orientations do not appear to indicate that

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either fracture set would readily convey groundwater in bedrock from the landfill toward the Edwards' well.

As a result, the information provided within the *PCE Investigation Summary Report* dated April 14, 2010 does not appear to be conclusive that a source other than the closed and unlined Madison County Landfill caused the contamination within the Edwards' well. Therefore, based upon the following, the Solid Waste Section is requiring additional assessment: (1) no recommendation was made for additional sampling or assessment within the text of the report even though there were volatile organic compound detections and exceedances; (2) auger refusal was shallow due to rock or soil density ranging from 11-18 feet below ground surface; (3) PCE and/or daughter products were not detected within any of the soil and mulch samples; (4) no recommendation was made for conducting detailed investigations to determine the interconnectivity of the fractures located between the landfill and the Edward's well; and (5) the analytical results within the *PCE Investigation Summary Report* appear to be inconclusive. In addition, the current groundwater monitoring well network that monitors the three disposal areas consists of only two groundwater monitoring wells, a background spring (not a groundwater monitoring well), and two off-site potable wells. The current groundwater monitoring system for the facility needs to be upgraded immediately.

As stated within the November 23, 2009 letter issued to Madison County,

> In accordance with 15A NCAC 2L .0106 (d)(1), a person conducting or controlling an activity under the authority of a permit which results in an increase in concentration of a substance in excess of the standards at or beyond the review boundary is required to undertake measures to prevent a violation of standards at the compliance boundary. Per 15A NCAC 2L .0107, a compliance boundary shall be established 250 feet from the waste boundary, or 50 feet within the property boundary, whichever point is closer to the source. In addition, 15A NCAC 2L .0106(d)(2) requires any person conducting or controlling an activity under the authority of a permit which results in an increase in concentration of a substance in excess of the standards at or beyond the compliance boundary to assess the nature and extent of the contamination and submit the results of the investigation and a plan for corrective action to the Division. Finally, Condition #8 of the December 21, 1995 Closure Letter for Permit #58-02 provides: "Groundwater quality at this facility is subject to the "Classification and Water Quality Standards Applicable to the Groundwaters of North Carolina", 15A NCAC 2L. 15 NCAC has been re-denominated as Chapter 15A of the North Carolina Administrative Code. "This includes, but is not limited to, the provisions for detection monitoring, assessment, and corrective action." Madison County is therefore responsible for the post-closure care and monitoring of the solid waste management facility pursuant to the rules codified at 15A NCAC 13B Section .0500, *et. seq*., .0600, *et. seq*., and N.C.G.S. 130A-309.27.

Therefore, Madison County shall acquire the services of a NC licensed professional geologist with experience in assessment and corrective action of groundwater contamination and submit a phased assessment plan to the Solid Waste Section for the assessment of the groundwater contamination at the closed and unlined Madison County Landfill. The phased assessment plan shall be designed to assess the type, source, concentrations, and horizontal and vertical extent of contamination within the vicinity of the landfill. This will require the installation of additional groundwater monitoring wells. The Solid Waste Section will review the submitted phased assessment plan, approve, or request additional information or amendments before implementation. The phased assessment plan shall then be implemented as approved. Please submit the phased assessment plan within 60 days of

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receipt of this letter. In addition, please continue to sample the Edwards' well on a monthly basis until an alternate water source is connected to the residence.

Immediately take all necessary steps to insure the protection of public health and the environment. Pursuant to N.C.G.S. 130A-22(a) and 15A N.C.A.C. 13B .0701 - .0707, an administrative penalty of up to **$15,000.00 per day** may be assessed for each violation of the Solid Waste Management Laws and Regulations. The Solid Waste Section solicits your cooperation and would like to avoid taking enforcement action. At the same time, it is your responsibility to comply with the requirements of the Solid Waste Management Statute and the North Carolina Administrative Code. If you have any questions or concerns regarding this matter, please feel free to contact me at (919) 508-8500 or by email at jaclynne.drummond@ncdenr.gov. Thank you in advance for your anticipated cooperation with this matter.

Sincerely,

Jaclynne Drummond
Hydrogeologist
Environmental Compliance
Solid Waste Section

cc via certified mail: Diane and Joel Edwards
(7008 0150 0000 3068 5081)
and email

cc via email: Jim Huff, Madison County Solid Waste Director
Douglas McVey, Madison County Health Department
Landon Davidson, Aquifer Protection (ARO)
Andrea Keller, Environmental Senior Specialist
Deb Aja, Western District Supervisor
Mark Poindexter, Field Operations Supervisor
Solid Waste Section Files

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